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Determinants of Trade Policy Responses to the 2008 Financial Crisis

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Abstract

The collapse in trade and contraction of output that occurred during 2008–09 was comparable to, and in many countries more severe than, the Great Depression of 1930, but did not give rise to the rampant protectionism that followed the Great Crash. Theory suggests several hypotheses for why it was not in the interest of many firms to lobby for protection, including much greater macroeconomic "policy space" today, the rise of intra-industry trade (specialization in specific varieties), and the fragmentation of production across global value chains ("vertical" specialization and the associated growth of trade in intermediates). Institutions may also have played a role in limiting the extent of protectionist responses. World Trade Organization disciplines raise the cost of using trade policies for member countries and have proved to be a stable foundation for the open multilateral trading system that has been built over the last fifty years. This paper empirically examines the power of these and other theories to explain the observed pattern of trade policy responses to the 2008 crisis, using trade and protection data for seven large emerging market countries that have a history of active use of trade policy. Vertical specialization (global fragmentation) is found to be the most powerful economic factor determining trade policy responses.

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Determinants of Trade Policy Responses to the 2008 Financial Crisis[1]

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1. Introduction

The collapse in trade and contraction in output that followed the 2008 financial crisis is comparable to, and in many countries more severe than, the Great Depression of 1930. Eichengreen and O'Rourke (2009) sum up: "...globally we are tracking or doing even worse than the Great Depression, whether the metric is industrial production, exports or equity valuations. ... This is a Depression-sized event." Figure 1 taken from Eichengreen and O'Rourke (2009) depicts, in parallel, the collapse of world trade following the Great Depression and the 2008 crisis. Trade fell far and fast immediately after the onset of both events.

The trade collapse during the Great Depression coincided with walls of tariffs rising around the world as countries closed their economies to protect their producers and keep employment from falling even further (Figure 2 from Clemens and Williamson 2001). Strikingly, despite the trade collapse, the 2008 crisis and its recessionary aftermath did not fuel protectionism. While the rampant protectionism following the Great Crash of 1929 was not in evidence in 2008-2009, this is not to say that there were no instances of protectionism after the crisis. Evenett and his collaborators (2009a, 2009b, 2011) have carefully documented over 1,400 new measures that discriminate against foreign products put in place between November 2008 and the end of 2010. The data compiled by the Global Trade Alert and the WTO illustrate that governments did seek to use trade policy as one instrument with which to respond to the crisis. However, the overall increase in protectionism was limited. Levels of protection post crisis were not unusual in comparison to the years before the crisis, and are not in any way comparable to the 1930s outbreak. Noteworthy has been a decline in the use of measures such as antidumping, safeguards and countervailing duty investigations and duty impositions, "traditional" instruments used by import-competing sectors during recessions (Bown, 2010). Equally noteworthy have been numerous instances of liberalization—many of the countries that were among the most active users of restrictive trade policies also tended to selectively reduce the level of protection for some products (Figure X [3]). The data reveal that countries can be separated into trade policy activists – pursuing a mix of trade restricting and trade liberalizing actions – and trade policy "abstentionists". The most active users of trade policy include Brazil, China, India and Russia – i.e., the large emerging markets – which have used policy to both increase and reduce protection levels (for different categories of goods). Thus, the stylized facts of the trade policy

responses to the crisis are that the overall level of protection did not increase substantially, that there was significant heterogeneity in the use of trade policy, and that this heterogeneity spans the direction of trade policy *within* countries as well as across countries. Moreover, developing countries, especially large emerging markets, were among the most active users of trade policy.

The question of why the deep recession was unaccompanied by heightened protectionism has many answers in theory. One-way trade flows that involve exchange of final consumption goods in one sector for final consumption goods in another have gradually been replaced by two-way trade in intermediates. This process has accelerated in the past two decades as specialization has increased in response to trade reforms and technological advances. Trade in intermediates intrinsically discourages protectionism as it penalizes the downstream domestic industries that rely on these imports. In parallel, declining transportation costs have separated stages of production for a good across different borders. Mexican maquiladoras, for example, perform labor-intensive stages of production of auto parts which are shipped back into the U.S. for further processing; Japan's exports to the U.S. involve goods that are partially processed in China. Since a multinational enterprise and its network of supplier firms often drive the supply chain on both sides of the border, there is no incentive to protect.[3]

Of course, although the growth in integrated supply chains may be a factor explaining the lack of large scale protection, there is still a significant volume of "traditional" trade involving exchange of final goods and products that are largely produced locally. Examples include agricultural and natural resource-based products. Such trade – as is trade in intermediates – is governed by GATT/WTO rules and disciplines that constrain the ability of governments to increase protection. These institutions have proved to be stable foundations for building multilateral trading relations over the last fifty years. Indeed, the proliferation of global supply chains itself owes something to that stability. Thus, the existence of these institutions is another possible factor that prevented protection from mushrooming around the world.

[3] In Baldwin (2009), many contributors argue that the collapse in trade was triggered by the collapse of output (demand). The exaggerated impact of output reduction on trade is ascribed to the growth in intermediates goods trade and vertically specialized global supply chains. These fundamentally new developments in trade, absent seventy years ago, are the reasons why the trade collapse is faster and deeper than during the Great Depression (and why the recovery was as fast).

In the case of OECD countries (high-income nations), WTO rules are particularly binding. These countries have all made commitments not to raise levels of protection above prevailing applied MFN tariffs: that is, tariffs are bound at applied rates. Moreover, applied rates are low on average, often around 5 percent or less. During the crisis there were no instances in which OECD countries raised tariff levels; instead these countries used instruments of contingent protection like antidumping and safeguards. Developing countries in contrast have much greater scope to raise tariffs as their WTO bindings are less complete and often involve so-called ceiling bindings that are far higher than applied tariffs. This "water in the tariff" allows countries to raise levels of protection without fear of retaliation by OECD trading partners. Any such increase in protection must be applied on an MFN basis. Insofar as they desire to target specific sources of imports they may use antidumping and safeguard measures. Thus, a question that arises is not just whether trade policies are used but what type of trade instruments are used. As noted OECD countries do not have this "policy space"—in this paper we therefore focus on the behavior of the large emerging markets.[4]

We use pre- and post-crisis trade and protection data to investigate the different explanations for (possible determinants of) observed trade policy responses. We find that the WTO has constrained the use of tariffs, despite countries having the policy space to raise them, but that measures of international specialization have a larger role in determining the use of trade policy measures. Given the higher productivity associated with greater integration and interdependence, countries that sever their trade links with the rest of the world do so at their own peril.

In Section 2 we describe forces, based on both economic interest and institutions that encourage and discourage protectionism. In Section 3 we describe the data and methods used to test hypotheses based on these theories. Section 4 investigates whether the influence of those forces changed after the crisis, towards or against protectionism. Section 5 concludes.

[4] From the data collected by the WTO and Global Trade Alert it is clear that OECD countries did not violate WTO commitments (tariff bindings), making any "test" of the role of the WTO as a source of institutional discipline moot.

2. Trade and Protectionism: Then and Now

Macro-economic forces

Irwin (2011) and Eichengreen and Irwin (2009) argue that the reasons countries rapidly erected trade barriers and tariff walls during the 1930s owed to circumstances that were different from today. The array of government policies during the Great Depression of the 1930s, including high tariffs, import quotas, and severe exchange controls to restrict capital outflow and keep current account balances from deteriorating, were designed to urgently tackle the problem of large and growing unemployment. Countries that remained wedded to the gold standard became more protectionist than countries who abandoned the gold standard and allowed their currencies to depreciate.[5] This predominantly macroeconomic explanation for the rise in protectionism is consistent with the inexperience of countries with expansionary Keynesian policies, which became known much later.[6]

The great trade collapse that occurred between the second quarter of 2008 and the third quarter of 2009 was the steepest fall of world trade in recorded world history. The trade-to-GDP ratio fell by a larger percentage than in any previous recession. The consensus view in Baldwin's (2009) collection is that the trade collapse was due to the demand shock triggered by the great recession that began with the US financial crisis and spread to the world economy. Chief among the factors that amplified the effect of the demand shock were the linkage effects of international supply chains (Bems, Johnson and Yi, 2009) and the growing income elasticity of trade due to new global supply chains and lean retailing (Freund, 2009).[7]

[5] The latter could, unlike the countries severely affected by inflations that followed WWI, and whose exchange rates remained anchored.

[6] In the 1930s fixed exchange rates of countries remaining on the gold standard led to real exchange rate appreciation and reduced the competitiveness of their products. Today, countries mostly do not maintain fixed exchange rates and can and do use monetary policy. The main 'macro-economic' variable that is a source of trade tensions and may generate a danger of a trade policy backlash to China's perceived mercantilism—claims that China is deliberately undervaluing its currency.

[7] Supply chains may actually be more resilient to trade collapses (Altomonte and Ottaviano, 2009). Due to the sunk cost of setting up supply chains, firms prefer to adjust the entire chain along the intensive margin rather than extensive margin. They find that trade fell more along the intensive margin (value per trader) than the extensive margin (number of traders). Possibly, large multinational corporations at the center of supply chains alleviate the liquidity constraints of suppliers, protecting their chains from finance shortages.

If the trade collapse is indeed a result of output (demand) collapse, as is now the consensus view,[8] the use of macroeconomic policies are the best policy response from the point of view of reversing the decline in trade.[9] If countries are confident about their macroeconomic policies, then there is less asymmetry among countries than there was in the 1930s. The threat of zero sum trade policy games among countries that pervaded the 1930s thinking is present to a much lesser degree. Clearly the concerted expansionary macro policy responses taken by G20 countries played an important role in the sharp recovery of trade in the second half of 2009 and 2010. However, the subsequent debt crisis has greatly constrained the scope to employ fiscal and monetary policies in almost all developed countries. Despite the impotence of macroeconomic policies, there has still been virtually no serious protectionism. This suggests other factors are at work.

Intra-industry trade

A substantial share of trade is intra-industry, with firms in different countries specializing in different varieties of similar products. A variety of reasons have been advanced for how intra-industry trade (IIT) can motivate trade policy, beginning with Krugman's (1981) demonstration of the gains from trade in the presence of product varieties. Models featuring domestic and foreign duopolies indicated that – unlike models that assumed zero-profit monopolistic or perfect competition – IIT did not necessarily mean freer trade, since these market structures allow rents to be shifted from foreign to home firms through strategic tariff policy (Brander and Spencer 1984). Even though the optimal action for both countries is to reduce tariffs, the unilateral incentive is for governments to use tariffs to play zero-sum games. If tariffs are strategic, then, a positive correlation between IIT and rents imply that tariffs should be positively associated with intra-industry trade. Jorgensen and Schroder (2006) show that an optimal tariff exists, below

[8] Levchenko et al. (2009) examine the role of three factors -- global supply chain effect, compositional effect, and the credit effect – in causing US trade to drop. They find compositional effect (i.e. trade driven by output) caused 50% to 100% of the drop. Schott (2009) also finds the decline in trade volumes among established trade relationships caused US trade to drop, implying trade should bounce back with output.

[9] The first best solution to the crisis itself must tackle a number of issues. In the same volume Krueger (2009) recognizes that global economy imbalances, and the low interest rates that resulted, were a key contributor to the crisis. Frieden's (2009) political economy view suggests deficit countries will increase exports on the backs of helpful government policies, while surplus countries will be pressured by their exporting firms to maintain government support as foreign firms become more competitive.

which welfare is reduced because there are too few domestic varieties and beyond which there are too many inefficiently-produced, costly domestic varieties.

Revenue motivation

A related, simple motivation for tariffs but a possibly empirically important one is simply that tariffs provide much-needed government revenue. In situations where governments are constrained fiscally there may be a positive relationship between tariffs and IIT, indicating the dependence of countries with weak tax systems on tariffs as a source of revenue.

Intermediates trade and use

Trade in intermediates accounts for over two-thirds of world trade. The early models of trade with intermediates by Ethier (1982) emphasized increasing returns in intermediates varieties. The explosion in intermediates trade appears to verify the large gains from trade demonstrated in Ethier's model. The rise in intermediates goods trade is a potential reason why protectionism did not increase. Downstream users of intermediate goods are naturally strong lobbyists against border tariffs on such goods, since tariffs only increase their input costs. Car producers, for example, want lower or no tariffs on steel. While the steel industry may benefit from an increase in tariffs, counter-lobbying by downstream users naturally restrain governments from imposing large tariffs on intermediates goods. Within the Grossman-Helpman (1994) protection-for-sale model, Gawande, Krishna, and Olarreaga (2011) show how counter-lobbying by downstream industries controls the demand for protection by upstream producers that compete with imports. When downstream industries combine intermediate inputs using Leontief technology they will lobby against protection to upstream industries, whose output they use as intermediate inputs. Protection to upstream industries is therefore naturally regulated. Tariff in industry *i* are determined as:

$$\frac{t_i}{1+t_i} = \frac{1}{a}\left[\frac{z_i}{e_i} - \frac{z_i}{e_i}\sum_{j=1}^{\infty}\frac{a_{ij}\ .\ y_i}{y_i}\right], \qquad (1)$$

where a_{ij} is the amount of good i used as intermediate input to produce one unit of good j and y_j is the gross output of good (Gawande, Krishna, and Olarreaga, 2011). Therefore, $\sum_{j=1}^{\infty}\frac{a_{ij}\ .\ y_i}{y_i}$ is

sector j's total intermediates use as a proportion of its gross output. z_i is sector i's inverse import-to-gross output ratio, e_i is the absolute import demand elasticity in sector i and a is Grossman and Helpman's political economy parameter indicating the relative weight government puts on a dollar of welfare relative to a dollar of contributions from industry lobbies. Across commodities, all else held constant, tariffs should vary inversely with the intermediate use-to-gross output ratio. Even without increasing returns as in Ethier, intermediates use can lower tariffs. With increasing returns in intermediates use it may be shown that there is even greater propensity to lobby against upstream protection.[10]

Vertical specialization

In Ethier's model each intermediate variety is produced domestically with constant returns to scale using a single factor. The rapid decline in transport costs that has occurred in the last two decades has allowed the production of intermediates varieties to be shifted across borders. This implies even greater gains as countries begin to specialize in the production of varieties according to their comparative advantage. Global supply chains enable multiple countries to contribute intermediate goods in stages, before the final good is delivered to its destination. This is a new development in trade. Johnson and Noguera (2009, Section 2.2) construct their example from how the iPod is produced: "The iPod combines a blueprint produced by Apple Inc.: in the U.S., with a Japanese display, a Japanese disk drive (manufactured in China), and assorted components of lesser value from Taiwan, China; Korea, etc. These components are assembled in China and the finished iPod is then shipped to the U.S. and inserted into distribution and retail channels."[11]

[10] An older literature has pointed out that the outcome of the political economy interactions can also be perverse by increasing the overall level of protection: instead of counter-lobbying the result of protection of an upstream industry may be that the downstream industry does the same. Current trade policy instruments often require that an industry demonstrates injury. The higher input prices following upstream protection will make it easier for the downstream industry that it has suffered injury. See Hoekman and Leidy (1992), The increase in fragmentation/vertical specialization has greatly reduced the likelihood of observing such outcomes.

[11] The example implies that gross bilateral exports incorrectly state the amount of *value added* by a country that is incorporated in its exports to a destination. A correct measure of domestic content embodied in a country's exports must take account of the production sharing that goes on across borders before these stages of production deliver a final good to a destination. For example, if semi-processed Japanese goods enter Singapore, where a small amount of value is added before the good is shipped for consumption to India, then gross Singapore-India trade overstates the true domestic content (value added) of Singapore that is embodied in Singapore-to-India exports, and gross Japan -India trade understates Japan's true domestic content that is embodied in Japan-to-India exports.

Combining input-output data with bilateral trade data, Johnson and Noguera quantify the extent of multi-country production sharing today (their Table 5) by computing the ratio of the domestic content of exports or *value added exports* to gross exports -- the "VAX ratio". Without trade in intermediates, the VAX ratios equal one, while cross-border production sharing reduces the ratio.[12] The bilateral VAX ratio for the U.S. varies between 0.57 with Canada (lots of production sharing) and 0.96 with Japan (not much production sharing). The same ratio for imports varies between 0.62 (Canada) and 1.07 (Japan). In general the U.S. VAX ratio with EU partners France, UK and Germany is around one; with geographically close partners like Canada and Mexico, and Asian partners like Malaysia, Taiwan, China and Korea, it drops down to around 0.6. The same ratio for imports is of similar magnitude with those partners. Johnson and Noguera's decomposition (their Table 7) indicates the following: Japan's exports to China are either absorbed in China or redirected to the U.S (as in their stylized iPod example) while Japanese exports to the U.S. are absorbed by the U.S. with little bilateral production sharing. In contrast, a large percentage of U.S. exports to China and Mexico are sent back to the U.S. for final consumption.

These findings have implications for the demand for protectionism. If output is falling, protectionism cannot shelter a domestic market. Protecting a stage of production is different from protecting the market for a good with no production sharing. Protecting a stage of production raises the cost of vertically specialized intermediates produced in that stage to the next user downstream, perhaps located in a partner country, and lowers demand for the output from the protected stage. With cross-border production sharing, where stages alternate across borders (e.g. US-Canada trade in auto parts) there is even less incentive to demand protection, since it raises the costs of intermediates to downstream producers within the protected country itself. With large vertically integrated firms increasingly the norm, it is often the same firm that performs different stages of production. It makes little sense for it to take an action that

[12] Returning to the example, the "VAX ratio" should be much lower than one for Singapore's exports to India and greater than one for Japan's exports to India.

ultimately raises its own costs. A simple maxim is therefore that the greater the production-sharing, the lower the incentive for producers to demand protection.[13]

That said, the Johnson-Noguera numbers also imply the existence of a great many imports without any production sharing (e.g. U.S. imports from Japan and from large EU partners). There will be a stronger incentive to restrict such trade and afford protection to import competing American producers. A trade war could result if partner countries then retaliated, since imports from the US are directly absorbed into their markets with little production sharing. In the case of developing countries the share of final goods in total imports is higher than for OECD nations and many are (much) less integrated into global value chains than more advanced economies. Thus there is significant heterogeneity across countries.

Institutions

The debate over the role of institutions like the WTO and regional trade agreements has focused on their impact on expanding trade (Rose 2004; Subramanian and Wei 2007, and Tomz, Goldstein and Rivers 2007). There has been less analysis of the efficacy and role of these institutions in keeping tariffs from mushrooming when producers the world over find their export markets shrinking and the competition intensifying. The prevention of trade wars like the ones that broke out in the 1930s is often mentioned as one motivation for the negotiation of the GATT/WTO. Bagwell and Staiger (1999) design their explanation for why the GATT/WTO has endured on the ability of rules such as reciprocity and the most-favored nation (MFN) clause to prevent countries from re-imposing "terms-of-trade externalities" that were reduced through the reciprocal exchange of market access liberalization commitments. Terms of trade externalities arise from the ability of large countries to impose optimal tariffs. Such beggar-thy-neighbor policies, while benefitting the (large) tariff-imposing countries, can start a trade war in which no one gains and everyone loses (Johnson 1954). Recognizing this terms of trade externality, countries negotiate to being down tariffs (and, doing so, internalize the externality). Bagwell and

[13] Baldwin (2010) develops a theoretical framework to analyze the political economy incentives that are generated by these types of interdependencies, showing that they produce pressures for unilateral liberalization and therefore do much to help explain why we have in fact observed significant unilateral liberalization of trade in recent decades.

Staiger (1999) view the GATT/WTO principles of MFN and reciprocity essentially as rules of negotiation which make it possible for governments to internalize the terms of trade externality.[14]

Ossa (2011) argues that the WTO allows governments to internalize production-location externalities as well as terms of trade externalities. This argument is more in line with the role of the WTO in quelling protectionism motivated by a desire to shift production to domestic locations – a big reason why tariffs exploded in the 1930s – rather than for optimal tariff reasons. By making a foreign product more expensive in the domestic market, a tariff shifts consumer expenditure towards domestic production. The greater profitability for domestic producers induces entry into the home market and exit out of the foreign market. Because of geography and consequent trade costs, this relocation of production increases domestic welfare and reduces foreign welfare; the share of goods consumed by domestic consumers that is subject to trade costs is reduced, while the share of goods consumed by foreign consumers that is subject to trade costs is increased. The GATT/WTO principles of reciprocity and nondiscrimination make it possible for governments to internalize this externality by allowing them to negotiate rules that restrict their ability to engage production relocation efforts.

Membership of the GATT/WTO can provide a mechanism for governments to deflect protectionist pressures from domestic special interests. The need to abide by GATT/WTO commitments and rules can be invoked by a government as a valid reason for convincing lobbies that adherence to those rules as signatories to the GATT/WTO limits the policy latitude it has left. This role of GATT/WTO rules as a commitment device is a core element of the policy literature (Tumlir, 1985) and has been theoretically examined by Staiger and Tabellini (1999), Maggi (1999), and, in the context of regional trade agreements by Maggi and Rodriguez-Clare (1998). Empirical support for this idea has been presented in Bown (2004). Thus, even where the natural opposition to trade barriers (from downstream users of intermediates, by cross-border production sharing, by intra-firm trade within the same firm across country borders) is absent, breaking their commitment to GATT/WTO rules entails costs for governments—in part as a result of the threat of retaliation and the associated welfare costs; more generally because not abiding by prior commitments reduces the prospects than trading partners will do so.

[14] Large importing countries may use their market power to impose optimal tariffs on imports. This market power may be measured by export supply elasticities (Broda, Limao and Weinstein 2008). We do not include export supply elasticities into our empirical analysis.

GATT/WTO negotiations revolve around tariff bindings, which may be – and often are – much higher than applied tariffs. Only eight members of the WTO have bound tariffs at applied levels: Canada; China; the European Union; Hong Kong, SAR China; Japan; Macao, SAR China; Taiwan, China; and the United States (Messerlin, 2008). A strategic reason for a country to negotiate high bound rates is give it the policy space to raise tariffs in the future. Even if bound tariffs are well above applied levels, tariff bindings and other policy commitments and rules such as national treatment, MFN and transparency mechanisms have value. They reduce the uncertainty confronting exporters regarding the upper bound on the costs of accessing a market. Such uncertainty will be reflected in a risk premium to reflect higher expected costs and deter investments to produce in or for a market – reductions in such policy uncertainty will increase the risk-adjusted rate of return and spur greater investment (entry), and raise welfare (Francois, 2001; Francois and Martin, 2004; Handley, 2010; Handley and Limão, 2011). As tariff levels fall such uncertainty costs become relatively more important as a determinant of the level of the fixed costs associated with contesting a market. Rules such as bindings, national treatment and MFN provide assurances that no matter what regulatory policies a government puts in place that affect a product these will apply equally to domestic firms and thus not affect the ability of the foreign firm to compete.

Either way one looks at it – whether the GATT/WTO rules eliminate one or the other type of externality or provide a commitment device to governments seeking to escape the influence of powerful lobbies – these institutions help prevent trade wars which everyone understands are negative sum games and reduce uncertainty regarding the policy environment that will prevail in a given market. Thus, the GATT/WTO may be an important factor why the huge trade and output collapses in 2008 were not accompanied by an outbreak of protectionism.

3. Data and Evidence on (No) Protectionism

3.1 Data

We analyze protection data for seven countries: Argentina (ARG), Brazil (BRA), China (CHN), India (IND), Mexico (MEX), Turkey (TUR), and South Africa (ZAF). Other than the fact that all these countries are trade-dependent, they were chosen because (i) their WTO-bound rates are

generally well above their actual applied MFN rates, allowing them trade policy space;[15] and (ii) they are users of WTO-permitted/disciplined instruments of contingent protection such as antidumping and safeguards actions (Bown 2011), as well as trade policy measures that are not yet within the purview of international rules. An important reason for choosing these countries is that they are heterogeneous by any trade measure: some countries are members of customs unions, others are members of shallower types of PTAs; some countries keep their applied tariffs close to multilaterally agreed bound rates, while others keep their tariffs far below their bound rates; some are large open countries in the sense of being able to dictate terms of trade in specific goods, while others are small open countries; some are proximate to large markets while others are geographically distant. All have a long history of trade policy activism, driven by industrial policy, economic development and non-economic objectives. Consistent inferences about protectionism across these heterogeneous countries would suggest they could be generalized.

The primary dependent variable is bilateral tariffs at the 6-digit HS level. The disaggregate level is necessary for analyzing protection since tariffs and nontariff barriers are determined at the product, not the sector, level. The data are from the WITS database, which includes information on both applied tariff rates and the institutionally-determined allowable upper-bound tariff rates at the HS level. Specifically, WITS contains bilateral bound rates as well as multilaterally agreed Most-Favored Nation (MFN) rates (see Appendix 1). We shall use these as a proxy for the strength of WTO rules such as non-discrimination and reciprocity. MFN tariffs, t_{MFN}, are what countries promise to impose on imports from other members of the WTO. If the country is part of a preferential trade agreement (PTA), it may favor its PTA partners by imposing lower – or even zero – tariffs that the MFN rate it charges other WTO member countries. Bound tariff rates, denoted t_{BND}, are what WTO members negotiate during multilateral trade rounds. The bound tariff is the maximum MFN tariff level that a country may levy for that commodity.

WTO members can and do keep their applied MFN tariffs below bound levels. Those that do therefore have the flexibility to increase applied tariffs while abiding with WTO rules. The commitment made by countries to these bound rates means that the bound rates are ceilings for

[15] The exception here is China, which bound tariffs at applied rates. As noted above, Canada, the EU, Japan and the US are in contrast not able to raise tariffs as their applied tariffs have been bound.

actual applied rates. Average bound tariffs in developing countries are three times average applied rates.[16] While the binding coverage (the share of tariff lines with WTO-bound rates) varies across countries, the Uruguay Round, which ended in 1994, has brought more uniformity and wider coverage in manufactures as well as agricultural products. The effectively applied tariff in the WITS database, denoted t, is the lowest applied tariff: if a preferential tariff exists, it is used as the effectively applied tariff; otherwise it is equal to the MFN applied tariff.

Foletti, Fugazza, Nicita and Olarreaga (2011) argue that the water in the tariff is an inaccurate measure of policy latitude, that is, some of it is "smoke". If an unreasonably high bound rate exceeds the rate at which imports fall to zero, then the prohibitive tariff defines the upper level of the water. Preferential tariffs resulting from PTAs further lower the level of water in the tariff. Our t_{BNDPRF} measure accounts for the smoke due to preferential tariff commitments in PTAs, but we do not impose an upper (equal to the prohibitive tariff) on t_{BND}. Foletti et al. find that 28% of the world's tariff water is smoke. Despite this, they agree that most countries that desire policy space in their tariffs have it. The policy space remains, on average, at over 60% of the water. t_{BNDPRF} thus serves to properly limit the majority of applied tariffs.

Table A1 in the appendix contrasts the seven countries with respect to their applied rates, MFN rates, and bound rates – as explained above, the applied and MFN rates differ mainly due to preferential rates for countries in PTAs. The statistics in Table A1 indicate that protectionism does not appear to be a good characterization of the tariff policies pursued by the countries in our sample. Of course, in practice many countries may respond to protectionist pressures through increased use of instruments of contingent protection such as antidumping and safeguard actions. We therefore also combine the WITS data with Chad Bown's temporary trade restrictions database at the 6-digit HS level in order to examine whether nontariff barriers like antidumping (AD) investigations have multiplied after the crisis.[17] Thus, we analyze two dependent variables. The first is applied bilateral tariff rates, and the second is the incidence of antidumping

[16] In the case of Brazil, for example, in 2008 the average bound level was 30.8 percent, compared to an average applied rate of 12.5 percent; for India the numbers were 36.2 and 11.5; Mexico: 34.9 and 11.2; Turkey: 16.9 and 4.8; South Africa: 15.7 and 7.6 (Messerlin, 2008).

[17] This is available at: http://econ.worldbank.org/ttbd/

investigations that were initiated (regardless of whether these led to a favorable judgment, were dropped, or overturned).[18]

In examining the role of interests and institutions in keeping the protectionist desires of governments in check, we use simple econometric models, first to check if the variables that support the theoretical arguments work as we should expect, and then to compare the relationship between the level protection and its determinants before and after the 2008 crisis. If the relationship is approximately the same in the two periods, then we conclude that the factors that shaped protection before the crisis are the same factors that have held protection in check after the crisis.

3.2 Did Protectionism Increase?

There exist a number of avenues for countries to raise tariffs. Countries that have kept their applied rates below their bound rates ($t < t_{BND}$) can do so without violating WTO rules. The "water" in their tariffs, the amount by which bound (allowable) tariffs exceed applied (actual) tariffs, provides them with policy latitude. There are reasons why countries may not want to exercise this latitude. Nondiscrimination requires the new applied rates to be equally applied to all WTO members, so the protectionism is transparent to the more than 150 countries who are WTO members. Disturbing the status quo transmits the protectionist message to trading partners, inviting a similar response from trading partners. Trading partners whose own applied tariffs against the initiating country tariffs are below the bound rate, are likely to respond by raising their applied tariffs up to the bound rate.

Did these threats keep tariffs at their status quo? Table 1 compares pre-2009 versus 2009 tariffs. For each of the seven host countries (first column), the table indicates the 15 largest exporters to the host (second column) and the total bilateral imports by the host in 2009 (third column). The last three columns indicate, respectively, the simple average (taken across 6-digit HS commodities) of (i) the pre-2009 tariffs ($t_{pre\text{-}2009}$), (ii) the difference between 2009 and pre-2009 tariffs ($\Delta t = t_{2009} - t_{pre\text{-}2009}$), and (iii) the difference in difference between actual and bound

[18] Research has shown that investigations themselves have a chilling effect of trade independent of the final outcome, in part because firms subject to investigations are required to post a bond to cover possible future duties. See Hoekman and Kostecki (2009) for a summary of the literature.

rates: $\Delta(t - t_{BND}) = \Delta t - \Delta t_{BND}$.[19] Argentina's applied tariffs on Brazil are zero since they are both members of Mercosur, a free trade agreement. Argentina's average tariff on imports from China in the pre-2009 years (2006-08) was 12.05%. During 2009, this decreased by 1 percentage point. The $\Delta(t - t_{BND})$ column indicates that the distance of actual tariffs from bound tariffs did not change much, only 0.53 percentage points. The Δt column indicates that large negative numbers are more frequent than large positive numbers. India's applied tariffs have decreased across the board as has Mexico's. Tariff increases have been infrequent. Among the few examples is Australia's average tariff increase against Thailand by 2.01 percentage points (over a low rate of 1.71%).

Countries may increase or decrease their MFN tariffs and/or do the same for their preferentially agreed tariffs with their PTA partners (e.g. Mercosur tariffs after the Brazil devaluation in 1998). Whether reversal of preferences this is protectionism depends on whether one views PTAs as being protectionist in the first place. If PTAs divert trade away from efficient producers towards less efficient PTA-partners, reversing PTA commitments reopens the market to the most efficient producers. Much of the research on PTAs has focused on whether they divert trade. Less research has been devoted to the important question of whether trade agreements are institutions that may lower the impact of protectionism. PTAs can serve as devices that allow policymakers to commit to free trade and escape the clutches of lobbies representing import-competing producers. Maggi and Rodriguez-Clare (1998, 2009) show how free-trade agreements (FTAs) serve as commitment devices in the direction of free trade in situations where the impetus for protectionism comes from import-competing producers lobbies. By committing to an FTA, a government is able to avoid a large and dynamically costly distortion associated with the (mis-) allocation of resources for which it does not receive compensation by the lobbies.[20]

[19] Since $(t - t_{BND}) \leq 0$, if $\Delta(t - t_{BND})>0$ it implies that the applied tariffs approached their bounds from below, i.e. applied rates were closer to bound rates in 2009 than in years immediately before the crisis. Import-weighted averages present a similar overall picture.

[20] The idea here is that governments are responsive to the demands of protectionist lobbies, but the lobbies must pay the government compensation for the distortions that protection brings about. Since the misallocation of resources is likely to be large over time (e.g. financial and human capital is tied up in sectors that use it les efficiently than others), and the compensation lobbies are willing to make does not cover the costs of these unpredictable long-term distortions, governments a loth to satisfy their demands. FTAs allow governments a way out.

The existence of binding PTAs and WTO commitments implies that other avenues of protection than tariffs need to be used if governments desire to do so, such as antidumping duties, countervailing duties safeguards, and other nontariff barriers (NTBs). Using these measures is not unconstrained as the WTO lays out a set of criteria that must be satisfied when imposing such instruments. Antidumping investigations, for example, follow a prescribed timeline, and the award of AD duties occurs at the end of a rules-driven deliberate process. Judging by the number of complaints that are eventually successful in being awarded AD duties (Bown 2004), the process of awarding such NTBS makes their initiation less prolific than if countries were unilaterally able to impose such duties without a multilaterally agreed process. Bown (2010) reports that the number of antidumping and other investigations initiated as well as the imposition of duties during 2010 both declined significantly compared to previous years.

What about other NTBs such as licensing requirements or subsidies which, unlike contingent protection, may be imposed unilaterally? The Global Trade Alert (GTA) database contains data on the use of such measures.[21] Table 2 indicates an assortment of measures from the GTA database designed to protect domestic producers. Actions since November 2008 that discriminate against foreign producers (classified as "red" measures) number 1,385 as of March 2011 and include industry-specific support (guarantees; subsidies; tax relief; export credit insurance, loans, financial support to 'green' industries, etc.). However, since the GTA data effectively begins in 2009 it is not possible to say whether these measures have greatly increased since the crisis began. What can be said is that the number of new NTBs of a non-fiscal/non-subsidy nature imposed in the 2009-2011 period has been stable, with little variation year-on-year. There are no estimates of the ad valorem tariff equivalent of these measures.

Kee, Neagu and Nicita (2011) construct the Anderson-Neary trade restrictiveness index (Anderson and Neary 1994; Kee, Nicita, and Olarreaga 2009) for 2008 and 2009 to assess whether the crisis caused greater protectionism. They find that in the aggregate, less than 2% of the trade collapse may be attributed to protectionism, and the rest to the output collapse. Examples of countries where particular tariff increases lowered trade include Turkey (agriculture), India (agriculture), Russia (manufacturing) and Argentina (manufacturing), Canada, China and Brazil. However, the drop in trade due to tariff increases was negligible

[21] Downloadable from http://www.globaltradealert.org/data-exports.

compared to the trade collapse they experienced. Further, they find little evidence that increases in nontariff barriers like antidumping duties had an impact on trade.

4. Why No Protectionism?

4.1 Variables

In Section 2 we outlined theoretical arguments for why protectionism may have been held in check. We revisit the institutions versus interest-based arguments with a view to representing theories with measurable variables, testing their relevance to trade policy, and assessing the extent to which they were responsible for thwarting protectionism after the crisis.

Institutions

The influence of institutions is measured by the bound rate t_{BND}. While applied rates t are determined by each country, they are bounded above by their bound rate commitments at the WTO. Since the bound rates are determined in a multilateral negotiation they are taken to be exogenous. One basis for such a relationship is that the applied rate structure is simply the result of a linear formula applied to the bound rates. In that case the regression should indicate the formula for each country, and there should be nothing left for other variables to explain. The cross-commodity pattern of bound rates is largely determined by some tariff cutting formula referenced to a previously unilaterally determined rate structure (see e.g. Bchir et al. 2006). [22] Since the structure of bound rates reflects the historical structure and the political economy embedded in that structure, it may be expected that applied rates are also scaled down similarly so that the political status quo is maintained in the new structure of applied tariffs. Accession to WTO rule is both, a commitment device that allows the government to commit to freer trade (and increase the welfare of its polity), but also to continue to satisfy special interests as best as it can within a regime of lower protection. An applied rate structure that is a scaled down version of the original structure of protection achieves this goal. If this is true, then the cross-commodity structure of applied rates should bear a strong relationship with cross-commodity structure of bound rates.

[22] With respect to agriculture, this may not be true. During the Uruguay round developing countries used their right to set agricultural tariff bounds without reference to historical levels by setting these bounds at extremely high levels (Hertel and Winters 2005, p 41).

While bound rates form a ceiling for applied rates this does not mean that there must be a cross-sectional relationship between bound and applied rates. For example, large deviations from the bound rate may occur if countries (e.g. India) decide to lower their rates in the hope of reciprocal trade concessions by their partners. Preferential trade agreements are a chief reason for such deviations. For this reason, we define a composite measure t_{BNDPRF} which modifies the Bound rate whenever the Preferential rate is applicable: $t_{BNDPRF} = t_{BND}$ but replaced by t_{PRF} whenever t_{PRF} is applicable.

Interest

As discussed in Section 2, whether firms have an interest in protectionism depends on the structure of production. If trade is of goods that are mostly produced locally (e.g., horizontal IIT) the incentive to engage in protection is higher than if countries are heavily engaged in vertical specialization. We therefore construct measures of IIT and vertical specialization.

The bilateral exports and imports data in WITS allow us to construct a popularly used intra-industry trade measure *IIT* at the HS 6 digit: product as: IIT = 1 − |Imports-Exports|/(Imports + Exports). *IIT* lies between 0 (no intra-industry trade) and 1 (two-way trade in equal amounts). We construct this variable at the 6-digit level so as to get a measure that captures trade in similar but differentiated products.[23]

We measure the influence of intermediates use by the variable *IntermediateUse*, the fraction of output for each sector that is used as intermediate inputs by all other using sectors in the domestic economy.[24] It measures the intensity of counter-lobbying by downstream users against protection to upstream industries who produce the inputs. Even without the political economy considerations (as in equation (1)), if downstream users are the main source of value added in the economy, any liberalizations designed to benefit them should lower tariffs on

[23] Measuring IIT at a higher level of aggregation –as is often done in the literature – will by definition capture both horizontal and vertical IIT, as higher levels of aggregation will capture trade in intermediates as well as more processed or final goods that are all part of specific 4-digit or 2-digit category.

[24] This appears as $\sum_{j=1}^{\infty} \frac{a_{ij} \cdot y_i}{y_i}$ in equation 1, and is measured using input-output use tables (next fn.).

sectors whose output they use heavily. *IntermediateUse* is constructed by aggregating the proportions across sectors (columns) in input-output use matrices from the OECD.[25]

Two measures of vertical specialization, conceptualized by Hummels Ishii and Yi (2001) and Yi (2003), and formalized by Johnson and Noguera (2009), are used. We use the most up-to-date constructs of these measures by Daudin, et al (2011).[26] The vertical specialization measure *VS* is the share of imports in a sector that is used directly and indirectly, that is, embedded as intermediate inputs, in the country's own exports. The second measure *VS*1 is the proportion of a sector's exports used as intermediates by exporters in *other* countries. *VS*1 measures the intensity of two sources of anti-protectionist pressure. High tariffs on imports in a sector undermine the competitiveness of the sector's exports that intensively use those imports. Input-output tables indicate that the same sector is the largest user of imports by that sector. The first source of anti-protectionism is exporters of that sector, who will lobby against tariffs that raise their input costs, and make them uncompetitive. The second source of anti-protectionism is foreign lobbying (e.g. Gawande, Krishna and Robbins 2006) by exporters in other countries who are dependent on the source country for supplying them with intermediate inputs. Low or zero tariffs in the source country are desirable for keeping their input costs down.

The output-to-import ratio, *z,* has been popularized by the Grossman-Helpman protection for sale model; the output-to-import ratio measures the intensity of demand for protection by import-competing lobbies. Output determines the size of rents from protection; the lower are imports the smaller is the deadweight loss from protection. For each sector *z* is scaled down by the proportion of the sector's output that is used as intermediate input by other sectors in the economy, to account for counter-lobbying pressure by downstream users as described in Gawande, Krishna and Olarreaga (2011). The OECD input-output matrices used to construct the intermediates use data are also used to construct these netted-out inverse import penetration

[25] The OECD input-output use data are available at: http://www.oecd.org/sti/inputoutput/. They are aggregated at the 48 sectors (OECD's STAN system), which we map into ISIC rev 3 according to the mapping in De Backer and Yamano (2008, Table 2), and then into HS6. We chose the closest available I-O data to 2005. For the seven contries the I-O matrices are as of: ARG 1997; AUS 2004-05; BRA 2005; CHN 2005; IND 2003-04; JPN 2005; MEX 2003; THA 2005; TUR 2002; ZAF 2005.

[26] Guillaume Daudin generously provided the disaggregated measures, for which we are very grateful. The vertical specialization measures are constructed at the GTAP level of aggregation of 55 sectors, which are mapped into HS 6 digits according to a concordance provided by GTAP.

ratios, denoted z^{NET}.[27] Since the I-O matrices contain gross output, imports and exports for each I-O sector, the computation of z^{NET} encounters no concordance problems. They are replicated at the HS 6-digit level of the tariff data. The full Grossman-Helpman measure z^{NET}/e divides z^{NET} by the absolute import demand elasticity e: the more inelastic goods are afforded higher protection because the deadweight losses from protecting them are lower. Import demand elasticities, estimated by Kee, Nicita and Olarreaga (2008) for each country at the HS 6-digit level, are corrected for measurement error using Fuller's correction, before using them to construct z^{NET}/e.

We exploit within-partner variation (partner fixed effects) across commodities to make inferences about the influence of institutions and interest in determining the sources of protectionism. Descriptive statistics for variables used in the analysis are reported in Table 3. The relative importance of *IIT* varies significantly across the sample, ranging from around 0.08 for Argentina and South Africa, both large natural resource exporters to close to 0.2 for China and India. *IntermediateUse* indicates heavy reliance of downstream sectors on intermediates: on average, over 70% of gross output of each sector goes towards satisfying intermediate inputs needs of other sectors. India has the lowest average among the seven countries of 60%. Vertical specialization measures are significant. For our sample, the country averages of *VS* are: ARG (0.17), BRA (0.14), CHN (0.31), IND (0.20), MEX (0.27), TUR (0.24), ZAF (0.20).[28] For Mexico the intensive maquila activity in the auto and auto parts manufacturing contributes to the high *VS* value of 0.385 for this sector. While primary sectors (coal, oil, gas) naturally have large *VS1* values, manufacturing sectors do too. In Brazil, China, and India these sectors have *VS1* exceeding 35%: chemicals, rubber and fibers, iron and steel, non-ferrous metal production.[29]

[27] $z_i^{\text{NET}} = \frac{z_i}{e_i}\left[1 - \sum_{j=1}^{\infty} \frac{a_{ij} \cdot y_i}{y_i}\right]$. Therefore, equation (1) reduces to $\frac{t_i}{1+t_i} = \frac{1}{a}\left[\frac{z_i^{\text{NET}}}{e_i}\right]$.

[28] The *VS* measures for USA (0.15), S. Korea (0.38) and Singapore (0.64) indicate that large home markets imply smaller *VS* values.

[29] *VS*1 for some other countries are: USA (0.28), Korea (0.29), and Singapore (0.32).

4.2 Results

Estimates from a baseline partner fixed-effects model of applied bilateral tariffs that represents the influence of institutions and interest are reported in Table 4. They are intended to, first, indicate whether the cross-sectional pattern of tariffs accords with the theories that each variable represents for each of the seven countries, and second, to show how well the theories that the variables represent are able to explain the variation in tariffs across fine HS 6-digit commodities. The models perform well. Consider the first model for Argentina. The coefficient of 0.160 on t_{BNDPRF} indicates that as the bound rate (adjusted for tariff preferences to partners in trade agreements) increases from 0 to 1, Argentina's bilateral applied tariff increases from 0 to 0.160. One reason for the small coefficient, despite the availability of policy space,[30] may be that since the majority of this trade is carried on with Mercosur partners, so that competition from other partners is a non-issue. A quite different reason is that the Mercosur agreement has hastened the decline of inefficient industries in Argentine, which are no longer politically active seekers of protection, so that Argentina does not face protectionist demands from those sectors. If the structure of GATT/WTO incentives kept applied tariffs in check, then the small coefficient on t_{BNDPRF} should be the norm, and not necessarily a feature of belonging to PTAs. The row of coefficients on t_{BNDPRF} in Table 4 indicates this is indeed the case – the small coefficient on t_{BNDPRF} is the rule, not the exception, even for many countries that trade actively outside regional blocs.

The coefficient of 1.751 on *IIT* for Argentina indicates that intra-industry trade is associated with an increase in Argentinian tariffs -- the opposite of simple intra-industry trade models that emphasize the additional welfare gains from expanding varieties would predict. A number of reasons could explain this result. Jorgensen and Schroder's (2006) optimal tariff conditional on the number of domestic varieties produced may be one. Brander and Spencer's (1984) profit-shifting role of tariffs may be another. The positive sign on *IIT* may also simply indicate the dependence of countries with weak tax systems, like Argentina, on tariffs as a source of revenue. Since much of Argentina's trade is with its FTAs partners, more revenue means imposing higher tariffs on non-PTA partners, even if trade with them is two-way trade in similar

[30] Tables 1 and 2 in Foletti et al. (2010) indicate true water (effective policy space) of 15 percentage points in Argentina's tariff.

goods. Brazil and South Africa also have positive coefficients on *IIT*, indicating similar revenue needs. For China, India, Mexico and Turkey, however, *IIT* has a negative coefficient, in line with Krugman's (1981) thinking about the gains from variety in differentiated products for final consumers that *IIT* captures. Even though these countries also have weak tax systems, the gains from trade appear to overwhelm the need to use tariffs to for revenue motives. Unfortunately, we are not able to more finely discriminate among these theories in this paper.

The gains from expanding varieties for intermediates use within the country (Ethier 1982), does deter tariffs in some countries. The coefficients on *IntermediateUse* imply that the damping effect on protectionism of intermediates production is striking for India and South Africa. As intermediates use increases from 0 to 1, Indian tariffs would decrease by 4.83 and South African tariffs by 11.56 percentage points, respectively. Had tariff bindings not constrained applied tariffs, the same may be true for China. Perhaps because much of their trade is within PTAs, Argentina, Brazil, Mexico, and Turkey either have small coefficients or a surprising positive coefficient. The need to generate revenue may also play a role. Intermediates users themselves produce for various consumers: they may supply to final domestic consumers, to final foreign users or foreign intermediates users. Since the latter two measures are accounted by vertical specialization measures *VS* and *VS1*, the variable *IntermediateUse* accounts largely for final use by domestic consumers. Since they are "captive" consumers it is easier to tax producers who supply to them. The positive sign on *IntermediateUse* may reflect the use of tariffs to produce revenues, but in a way that does not hurt the producers' competitiveness.

The extent to which vertical specialization, measured by *VS* and/or *VS1*, deters tariffs is striking. While the measure *VS* does not deter tariffs in Argentina or Brazil – exporters in those countries may not powerful enough to overcome the need to raise revenues – the importance accorded to exporters in India, Mexico and Turkey is evident in lower tariffs on imports of goods used directly and indirectly in the exports of these countries. This is in spite of their weak tax systems. An increase in *VS* by 0.25 (approximately the country means) lowers tariffs in India, Mexico and Turkey by 6.65, 2.65, and 2.24 percentage points, respectively.

The second vertical specialization measure *VS1* produces a new finding about global supply chain as a force against protectionism.[31] The negative coefficients on *VS1*, across the table, affirm that home governments are keen to advance the interests of their exporters by reducing tariffs on the inputs used by (upstream) home exporters in order to enhance their competitive position with foreign users. That these supply chains can crisscross the home country many times is an added reason to keep tariffs down. The negative coefficients on *VS1* may also be taken as evidence for the idea that exporters in *foreign* countries may politically influence home tariffs since their competitiveness depends on the supply of cheap inputs from home producers. One mechanism to achieve this is to press their own governments to bargain with the home government to reduce their tariffs; another involves direct lobbying of the home government. Since *VS1* is closely related to multinationals activity with their affiliates and foreign direct investment undertaken by these MNEs (Hummels et al 2001; Hanson et al. 2005; Alfaro and Charlton 2009; Baldwin, 2010), it may well proxy those influences. For those reasons, the quantitative impact of *VS1* is striking. As the share output of Brazilian exporters that is used further by exporting firms in partner countries increases from 0 to the country mean of 0.21, Brazil's tariffs decrease 5.953 percentage points. Most countries in our sample have similarly large estimates on *VS*1. China's, we hazard, would be similar if their bound tariffs were less constraining.

The political economy variables z^{NET}/e inform about the propensity for protectionism – the inverse of its coefficient estimates the parameter a in the extended Grossman-Helpman model. The positive and statistically significant coefficient of 0.046 on z^{NET}/e for Argentina reveals from its tariff policy that Argentina's government weights a dollar of consumer welfare 22 times as much as it weights a dollar of contributions from import competing lobbies. The parameter a is estimated from Table 4 to equal 142 for Brazil, 111 for China, and 7.3 for Turkey. India, Mexico, and South Africa have negative coefficients indicating they are welfare maximizers.[32]

[31] Near-collinearity of *VS* and *VS*1 is not the reason for opposite signs on their coefficients. Even if they are included separately (or individually), the signs for Argentina and Brazil are as they appear in Table 4.

[32] This is possibly due to the incorrect assumption that all sectors are politically organized, but we maintain the assumption and assume that a negative coefficient implies welfare maximization. We also do not correct for the endogeneity in the regressor z^{NET}/e, which biases its coefficient upwards.

The models fit the data quite well. For example, China's tariffs are strongly institutionally determined. China's tariffs move closely with their bound rates and the preferential commitments in China's bilateral and regional trade agreements. Over 95% of the variation in Chinese tariffs is explained by the within variation in these variables, primarily in the institutional tariffs. However, the institutionally determined tariff bound is not the sole, or even the most important, determinant of the tariff structure for other countries. Though Argentina and Brazil belong to the Mercosur agreement, interest plays a large role in determining which sectors may or may not receive protection. The same is true for India, Mexico, Turkey, and South Africa. Even in China's case, the interest variables are statistically significant implying they would hold their own in controlling China's tariffs had Chinese tariffs not been WTO-constrained. These findings are significant for the increasingly integrated world in which these countries will not just interact, but will define.

Pre- and Post-Crisis

In Table 5, each variable is interacted with a post-crisis dummy to ascertain whether the relationships observed in Table 4 remained unaltered through the crisis or were fundamentally changed by it. Change in the direction of greater protectionism should concern us, given the experience with the Great Depression. It is possible that the full trade policy response has not yet unfolded, and that the exogenous change in the variables due to the sudden trade and output shock will be met with a lagged response. But trade policy did respond with rapidity and force during the Great Depression. Therefore, we believe the post-crisis change in our coefficients contain important information about future trends. Among the reasons why we think our results are of interest is the heterogeneity of policy responses across countries.

Consider the coefficient on the interaction term $t_{BNDPRF} \times I_{2009}$. The negative and statistically significant coefficients for China, India, and Mexico indicate that even where tariff water allows policy discretion, these countries actually lowered their tariffs, on average. South Africa, Turkey and Brazil, do appear to feel the pressure in the post-crisis period to raise tariffs if t_{BNDPRF} allowed them the latitude. In the case of South Africa, for example, the coefficient on t_{BNDPRF} increased by 0.165 in 2009 over a pre-crisis coefficient of 0.10, signaling a readiness to increase tariffs up to the bound levels. For other countries, the magnitude of the coefficient change is still small, considering the magnitude of the crisis.

The positive and statistically significant coefficient on $z^{NET}/e \times I_{2009}$ for Argentina, Brazil, China, and South Africa indicates a lowering of their *a* parameters, that is, an increasing susceptibility of these governments to the lobbying dollars of import-competing producers. We would expect lobbies to put intense pressure on their government to protect domestic markets in the face of severe price competition from exporters during a trade collapse. Reassuringly, these coefficients are still small and do not signal a move to serious protectionism.

The positive coefficient on $IntermediateUse \times I_{2009}$ for Argentina, China, South Africa and especially India may indicate that tariff revenue trumps the need to provide using sectors with cheaper intermediate inputs. Heavy downstream users of intermediate inputs, but whose final output primarily supplies the domestic market (e.g. utilities, construction), may not deter governments from pursuing revenue by taxing the upstream sectors who produce these intermediates. Since these sectors are captive, and may even be regulated, they may not have the bargaining or lobbying power of other downstream users who compete in the export markets.

In contrast, users in the global supply chain face greater competition, and the quantity of use is far more price-sensitive. Strong evidence of this is present in the coefficients on the vertical specialization measures: $VS \times I_{2009}$ and $VS1 \times I_{2009}$. The latter term has a large negative coefficient of -16.22 for India. In the post-crisis period, exporting sectors in India's partner countries appear to have had a strong influence on lowering Indian tariffs, specifically on products they import from India for their own intermediates use. Keeping the cost of those inputs down makes them more competitive, in turn, increasing their purchase from Indian suppliers and expanding India's exports. For India, the anti-protectionist response of tariffs to *VS*1 has increased four-fold from the pre-crisis era. This source of anti-protectionism is also evident for Brazil and Turkey. In the case of China, Mexico, South Africa, and Argentina, *VS* is the main source of anti-protectionism after the crisis: domestic exporters are the prime movers in demanding lower protection on imported goods they intensively use. Thus, though *IntermediateUse* has declined as a force against protectionism in India, China, Argentina, and South Africa after the crisis, vertical specialization via *VS* or *VS*1 influences governments to reduce tariffs. The new finding is that sectors whose output is used as intermediates inputs by *foreign* exporters have been further liberalized in Brazil, India, and Turkey in the post-crisis era.

Argentina, China, Mexico and South Africa, on the other hand, have felt the pressure to liberalize in sectors where imports feed intermediates input needs of *domestic* exporters.

A country-by-country summary highlights the heterogeneity in the sources of economic and political pressure on trade policy after the crisis. For Mercosur partners Argentina and Brazil, vertical specialization has been the source of downward pressure on tariffs – *VS* for Argentina and *VS*1 for Brazil. Intermediates use domestically has also been a factor in Brazil's case. India has struggled with raising tariff revenue versus liberalizing trade. Sectors that supply domestic users of intermediates (*IntermediateUse*) as well as sectors whose imports are used by domestic exporters (*VS*) have been more heavily taxed after the crisis. Foreign exporters, however, wield a strong liberalizing influence on India through *VS*1. Mexico, in contrast has responded to domestic users, both producers and exporters, of produced or imported intermediates (through *IntermediateUse* and *VS*). Although China's WTO commitments have held their average tariff at a low level, the liberalizing influence of all three – *IntermediateUse* , *VS* and *VS*1 – is in evidence after the crisis. Turkey, like the other countries, held steady after the crisis and responded by continuing its liberalization.

Finally, in Table 6, we look at the incidence of anti-dumping investigations using conditional logits with partner-fixed effects. Previous investigations of anti-dumping and countervailing investigations have restricted their samples to only cases in which anti-dumping, countervailing and safeguards investigations were carried out. Here we compare HS 6-digit commodities on which antidumping investigations occurred with the overwhelming number of cases in which there were no such investigations.[33] Due to the lack of data, we have results for five of the seven countries. The positive coefficients on the applied tariff interactions $t \times I_{2009}$ for China and Argentina indicate they may have stepped up anti-dumping investigations after the crisis as a complement to tariffs. In China's case it makes sense that the restriction of policy space in tariff policy is made up by means of nontariff measures. For Turkey , the positive coefficient on $IIT \times I_{2009}$ indicates that tariffs and AD were substitutes in the post-crisis period;

[33] A feature of this model is that the set of observations with no within variation (for a specific partner) are dropped, because they provide no information for discriminating and estimating the logit parameters. The sample used by the logit models is therefore smaller. A linear probability model with the full sample produces near-zero coefficients all around because the incidence of AD investigations is negligible. We may be missing a sample selection model based on characteristics of commodities that make them prone to AD investigations. We leave this open for future research.

perhaps the increase in AD investigations were used to pacify sectors experiencing reduced tariff protection. *VS* has contributed towards reducing the incidence of AD investigations in Argentina, Brazil and China, while there is some evidence that *VS*1 has contributed towards the same in India.

5. Conclusion

WTO and PTA commitments constrain the policy space of member governments to varying degrees depending on the depth of the commitments made. With the exception of China, most developing countries and emerging markets have substantial freedom to raise tariffs. In practice however most countries did not utilize this policy space following the 2008 financial crisis and the ensuing collapse in global demand and trade. The protectionist outbreak that followed a similar collapse during the Great Depression was not observed in 2009 and following years. Why has this been the case?

While the influence exerted by the WTO is in evidence, our analysis reveals that it is not the only limiting influence on countries' trade policies. Despite the significant headroom that existed to raise tariffs in six of the seven countries in our sample, none used this policy space for greater protection in the post-crisis period. Our regressions indicate that the crisis did bring about increased demands for protections, but that the position of domestic and foreign exporters in the global supply chain exerted offsetting liberalizing forces in many countries. The demand for cheap inputs by downstream users, both domestic suppliers and exporters, and the demand for a country's exports by vertically-specialized exporters in partner countries, exert countervailing pressure against protectionism, whether from domestic lobbies or reflecting the revenue needs of governments. Thus, the economic interest of users and vertically specialized firms that has been a factor driving unilateral liberalization (Baldwin, 2010) helped keep protectionism in check globally during the crisis. The structure of tariffs in India, Brazil, and Turkey is influenced by demands of vertically specialized foreign exporters who depend on Indian exporters for their inputs. In Mexico, China, Argentina, and South Africa, it is the demand of vertically specialized domestic exporters that curbed protectionism. In Mexico and Brazil, users of intermediates who produce for the domestic market were an additional source of anti-protectionism.

Different countries behave differently in their trade policies. But while this heterogeneity is an important message from our results, our main message is that the nature of trade today produces powerful incentives against protectionism. Certainly institutions like the WTO have contributed to it. Unlike the current literature, which focuses on terms of trade externalities in assessing the beneficial impact of the WTO, our results indicate that there are other, more powerful, forces at work undermining protectionism. Greater specialization brought about both by the large reductions in trade costs and the integration of populous countries that has multiplied the scale of global trade drives this change. The biggest benefit of the WTO may well be that, by reducing trade policy uncertainty and having supported a decades-long process of multilateral liberalization of trade, it has facilitated the greater specialization manifest in global supply chains and the associated profusion of MNE activity that is now a potent force for maintaining open markets. We find little evidence that the post-crisis period is so greatly different from the years preceding the crisis that protectionism should be cause for worry.

However, monitoring reports by the WTO and the GTA also make clear that there has been a step increase in the use of trade policy post-2008, working to both increase and reduce the level of barriers to trade in specific products, and targeting both exports and imports. Many countries took actions to lower trade costs and the price of imports. Sometimes this was aimed at lowering prices of consumer goods (food); in other instances the aim was to support domestic downstream industries (industrial inputs). Disentangling the multitude of trade policy measures and their determinants (the underlying government objectives) will be a rich area for research in the years to come, helping to better understand the political economy of trade policy in a world that is increasingly characterized by vertical specialization. The same applies to assessing the net impact of the policy responses on global trade. The fact that bailouts and stimulus packages – even if they were designed to be discriminatory – were significant in size and number and most likely had beneficial effects on global trade is a factor that must be considered in any assessment of the trade effects of 2008-09 policies.

The pattern of trade policy use reflects the reality of a more intricately linked global trading environment where countries are increasingly part of global value chains. This has changed the dynamics of the traditional political-economy of trade policy, where domestic industries and workers lobby for import protection. The changing nature of imports and exports –

increasingly, intermediate inputs and re-exports – seems to have supported open trade. How robust (strong) this new constellation of trade interests will be is something that only time will tell. Global growth prospects are likely to remain subdued for some time to come. The scope for new stimulus measures is now much more limited than it was in 2008. A sluggish world economy and high unemployment rates across the globe, as well as inflation and currency appreciation in a number of emerging economies will increase pressure on governments to promote domestic economic activity. Recent hike in tariffs on automobiles by Brazil illustrate that open trade cannot be taken for granted. Continued monitoring of trade policy measures is therefore important.

Appendix 1: Tariffs in the WITS Database

Adapted from:
http://wits.worldbank.org/WITS/wits/WITSHELP/Content/Data_Retrieval/P/Intro/C2.Types_of_Tariffs.htm)

Most-Favored Nation (MFN) Tariffs: MFN tariffs are what countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement. This means that, MFN rates are the maximum that WTO members charge one another. Some countries impose higher tariffs on countries that are not part of the WTO.

Preferential Tariffs: Virtually all countries in the world joined at least one preferential trade agreement, under which they promise to give another country's products lower tariffs than their MFN rate. These agreements are reciprocal: all parties agree to give each other the benefits of lower tariffs.

Bound Tariffs: Bound tariffs are specific commitments made by individual WTO member governments. The bound tariff is the maximum MFN tariff level that a country may levy for that commodity. When countries join the WTO or when WTO members negotiate tariff levels with each other during trade rounds, they make agreements about bound tariff rates, not actually applied rates.

Effectively Applied Tariff: When analyzing the effects of preferential tariffs on trade flows you will need to be careful with assumptions about which tariff rate is actually applied to a particular import. The importing country will apply the MFN tariff if the product fails to meet the country's rules that determine the product's country of origin. WITS uses the concept of effectively applied tariff which is defined as the lowest available tariff. If a preferential tariff exists, it will be used as the effectively applied tariff. Otherwise, the MFN applied tariff will be used.

The binding coverage, or the share of tariff lines with WTO-bound rates, varies across countries. Until the Uruguay Round of the GATT, which ended in 1994, countries agreed to bind tariffs only on manufactured goods. Trade in agricultural products was excluded from the GATT when it was written in the late-1940s. Even within manufactured products, countries were not obligated to bind all tariff lines. During the Uruguay Round, countries committed to bind tariffs on all agricultural products. New members of the WTO have been asked to bind all manufactured tariff lines as well. The binding coverage varies by region. In Latin America, practically all countries bind all tariff lines. In Asia, the binding coverage varies from less than 15 percent in Bangladesh to 100 percent in Mongolia.

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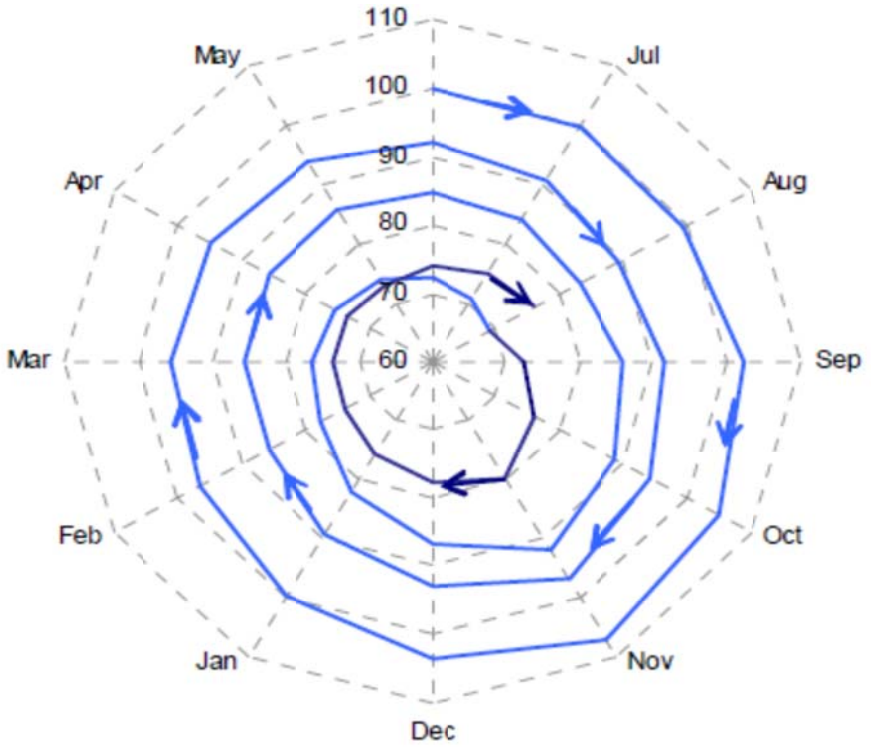
<u>Figure 1:</u> Decline in World Trade 1929-33 (June 1929=100)

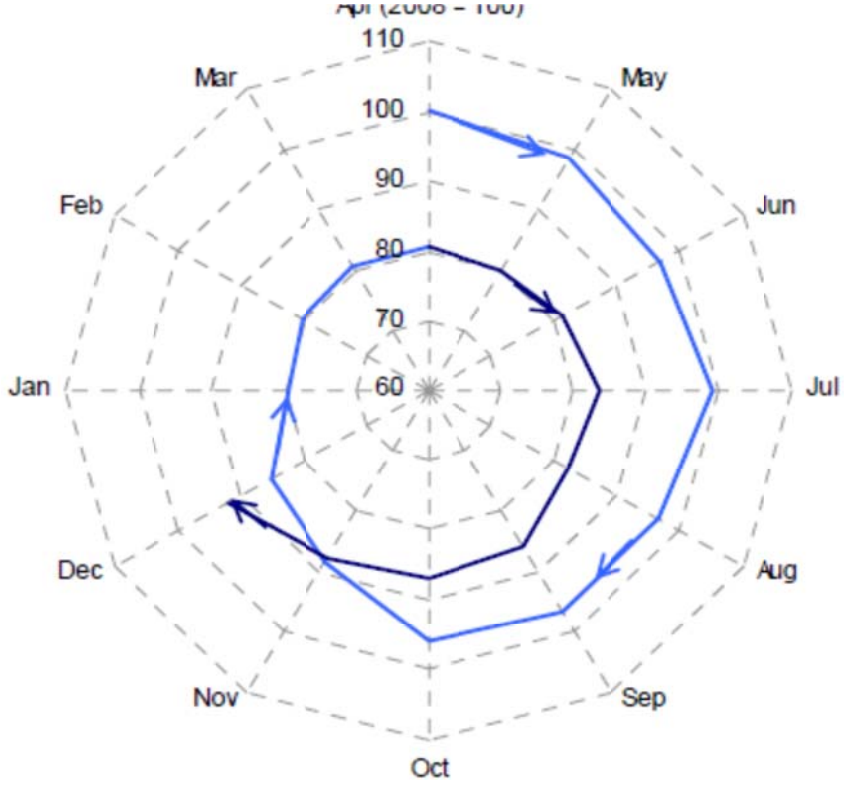
June 29 – July 32 (Low=6/1929; dark blue from August 1932)



Decline in World Trade 2008-09

June 29 – July 32 (Low=6/1929; dark blue from August 1932)

(*Source: Eichengreen and O'Rourke 2009*) 'A Tale of Two Depressions', available at *VoxEU.org*.



Source: Eichengreen and O'Rourke (2009)

<u>Figure 2:</u> Unweighted World Average Own Tariff, 35 Countries, %

(Clemens and Williamson 2001)

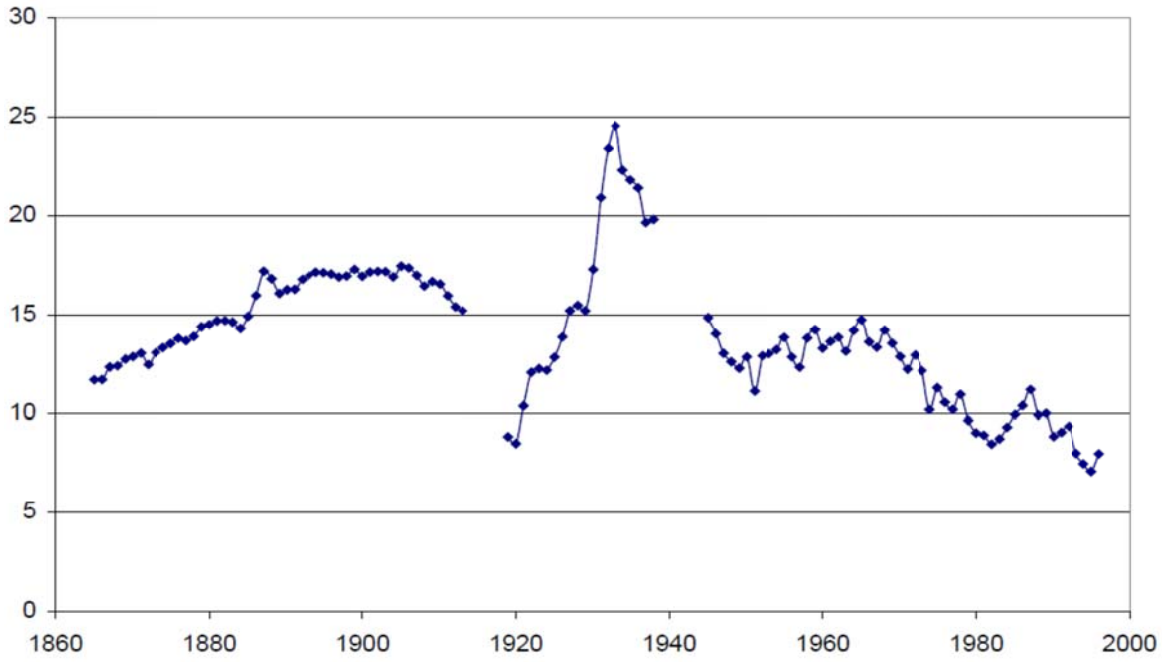
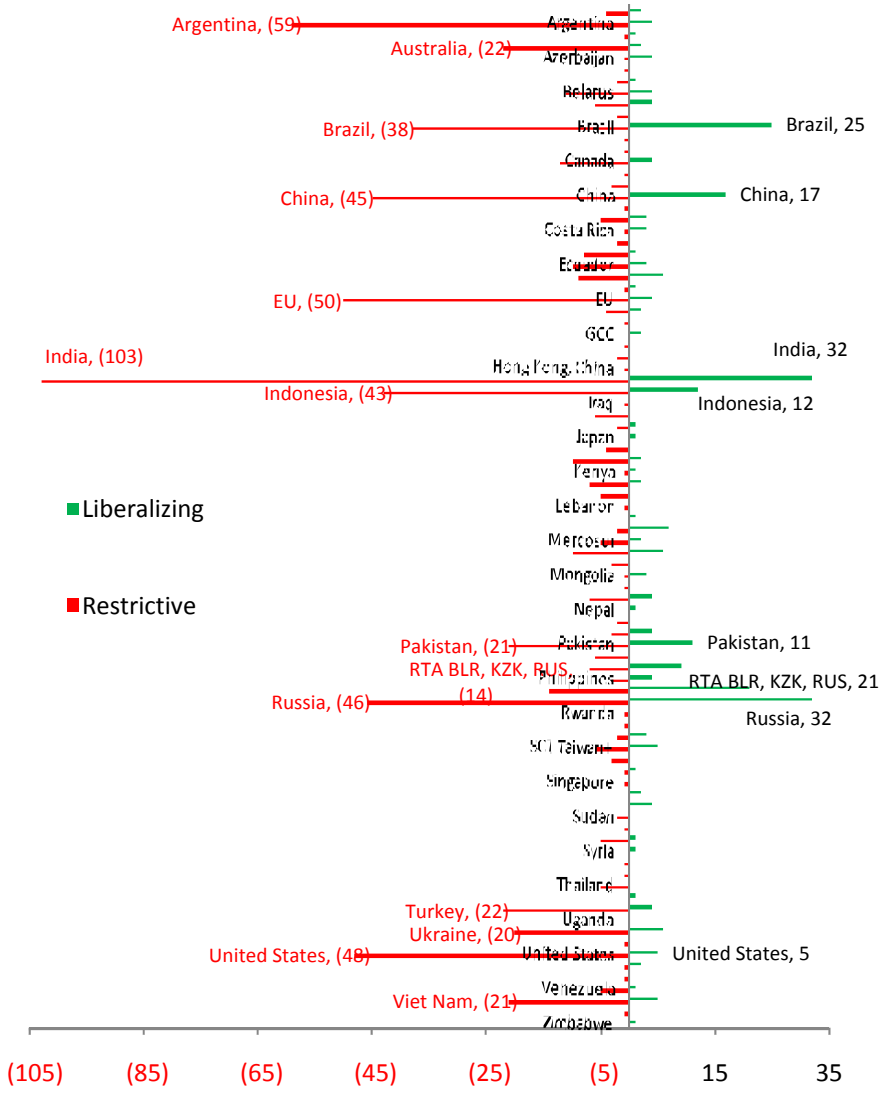


Figure 3: Number of new trade measures, end 2008-March 2011



Source: Datt, Hoekman and Malouche (2011) from WTO data.

Table 1: Pre- versus Post-2009 tariffs. By partner (top 15 partners by 2009 imports)

Host	Partner	2009 Imports ($ Mn.)	Simple Average t (applied)	Δt (pre and post-2009 difference)	$\Delta(t - t_{MFN})$	$\Delta(t - t_{BND})$
ARG	BRA	9,904,532	0.00	0.00	0.58	0.09
ARG	USA	4,465,682	11.02	-0.77	0.00	-0.19
ARG	CHN	3,488,877	12.06	-1.00	0.00	-0.53
ARG	DEU	1,904,472	10.68	-0.33	0.00	0.01
ARG	MEX	841,505	6.93	-1.93	-1.75	-1.91
ARG	JPN	798,902	11.66	-0.29	0.00	0.04
ARG	ITA	777,473	11.89	-0.91	0.00	-0.30
ARG	FRA	770,788	11.86	-0.49	0.00	0.11
ARG	ESP	753,847	12.00	-0.67	0.00	-0.21
ARG	PRY	685,500	0.07	-0.07	1.50	0.39
ARG	CHL	577,868	0.81	-0.54	-0.17	-0.27
ARG	KOR	549,857	13.43	-0.79	0.00	-0.27
ARG	UNS	389,026	12.12	-0.04	0.00	0.41
ARG	THA	361,769	14.70	-0.68	0.00	-0.28
ARG	CHE	361,091	11.09	-0.22	0.00	0.37
BRA	USA	17,100,000	12.96	1.01	0.00	0.97
BRA	CHN	11,200,000	14.23	1.30	0.00	1.32
BRA	ARG	9,870,029	0.00	0.00	-1.08	0.14
BRA	DEU	8,790,500	12.56	0.66	0.00	0.62
BRA	NGA	4,721,049	13.95	-1.71	-0.04	0.08
BRA	JPN	4,520,785	12.91	0.40	0.00	0.48
BRA	KOR	3,340,994	14.58	1.20	-0.01	1.25
BRA	ITA	3,292,578	13.91	1.26	0.00	1.21
BRA	FRA	3,274,976	13.42	0.99	0.00	1.05
BRA	CHL	2,541,617	0.53	-0.28	-0.84	-0.50
BRA	MEX	2,255,538	9.01	0.43	-0.10	0.12
BRA	GBR	1,822,868	12.73	0.67	0.00	0.51
BRA	CHE	1,766,936	12.96	0.44	0.00	0.47
BRA	ESP	1,757,484	13.50	1.14	0.00	0.95
BRA	BOL	1,646,438	0.17	-0.11	1.39	0.91
CHN	JPN	101,000,000	9.71	-0.18	0.00	-0.18
CHN	KOR	66,700,000	9.52	-0.67	-0.55	-0.74
CHN	USA	63,600,000	9.77	-0.22	0.00	-0.18
CHN	DEU	51,700,000	9.65	-0.19	0.00	-0.18
CHN	TWN	51,200,000	9.58	-0.01	0.00	-0.16
CHN	CHN	48,000,000	9.88	-0.86	-0.61	-0.77
CHN	AUS	38,800,000	9.60	-0.12	0.00	-0.21
CHN	BRA	27,700,000	8.71	-0.01	0.00	-0.25
CHN	SAU	23,300,000	9.53	-0.35	0.00	-0.33
CHN	RUS	18,400,000	7.35	0.28	0.00	-0.19

Host	Partner	2009 Imports ($ Mn.)	Simple Average t (applied)	Δt (pre and post-2009 difference)	$\Delta(t - t_{MFN})$	$\Delta(t - t_{BND})$
CHN	AGO	14,700,000	3.24	1.04	0.00	-0.62
CHN	MYS	13,300,000	6.90	-4.38	-4.36	-4.54
CHN	IND	13,200,000	9.48	-0.77	-0.64	-0.80
CHN	THA	13,100,000	7.11	-4.27	-4.09	-4.28
CHN	IRN	12,900,000	8.00	-0.50	0.00	-0.33
IND	ARE	18,200,000	10.80	-0.14	0.00	0.96
IND	CHN	17,800,000	14.21	-4.33	0.00	-3.18
IND	USA	12,800,000	10.24	0.18	0.00	0.28
IND	DEU	7,549,263	14.52	-4.21	0.00	-3.45
IND	BEL	4,962,402	13.26	-3.92	0.00	-4.62
IND	KOR	4,734,314	13.81	-4.62	0.09	-7.46
IND	JPN	4,619,368	13.72	-4.33	0.00	-3.38
IND	HKG	4,416,966	14.67	-5.47	0.00	-3.69
IND	FRA	3,451,474	14.76	-4.61	0.00	-4.17
IND	GBR	3,181,521	10.61	-0.04	0.00	0.56
IND	ITA	2,935,895	14.96	-4.61	0.00	-4.47
IND	SGP	2,862,321	12.98	-5.16	-1.48	-5.50
IND	BRA	2,389,710	13.54	-3.55	0.00	-3.45
IND	ZAF	2,290,508	15.15	-4.13	0.00	-4.86
IND	THA	2,061,318	10.36	0.02	-0.07	0.31
MEX	USA	88,800,000	0.02	0.23	2.70	0.19
MEX	CHN	20,100,000	13.32	-2.64	0.00	-2.63
MEX	DEU	8,777,437	1.43	-1.11	1.93	-1.08
MEX	JPN	8,751,149	9.54	-5.11	-2.01	-5.07
MEX	KOR	7,863,543	13.85	-3.00	0.00	-2.91
MEX	CAN	5,488,370	0.12	-0.01	2.74	-0.04
MEX	BRA	2,757,817	10.43	-2.63	0.56	-2.63
MEX	ITA	2,596,180	1.49	-1.13	1.32	-1.16
MEX	TWN	2,546,733	13.88	-2.94	0.00	-2.91
MEX	ESP	2,232,401	1.60	-1.14	1.30	-1.11
MEX	FRA	1,962,919	1.65	-1.11	1.71	-1.17
MEX	GBR	1,541,341	1.39	-1.07	1.88	-1.10
MEX	CHL	1,293,292	2.60	-2.41	0.48	-2.17
MEX	CHE	1,093,640	5.02	-4.50	-1.69	-4.42
MEX	MYS	987,759	14.95	-3.10	0.00	-3.15
TUR	DEU	12,200,000	1.11	0.34	-0.02	-0.43
TUR	CHN	8,702,965	2.75	0.10	0.03	0.59
TUR	RUS	8,029,761	2.60	-0.12	0.05	-1.21
TUR	USA	7,194,160	4.92	0.46	0.00	0.57
TUR	ITA	6,379,579	0.85	0.45	0.08	0.22
TUR	FRA	6,208,933	1.15	0.43	0.03	0.37
TUR	ESP	3,416,477	0.82	0.13	-0.09	0.79

Host	Partner	2009 Imports ($ Mn.)	Simple Average t (applied)	Δt (pre and post-2009 difference)	$\Delta(t - t_{MFN})$	$\Delta(t - t_{BND})$
TUR	GBR	3,018,578	0.71	0.33	-0.02	-0.01
TUR	KOR	2,454,631	4.12	-0.01	0.00	0.13
TUR	UKR	2,428,488	5.73	-0.29	-0.20	2.32
TUR	JPN	2,413,586	3.80	0.45	0.00	-0.32
TUR	BEL	2,040,077	0.87	0.12	0.01	0.08
TUR	NLD	2,016,612	1.36	0.29	-0.13	-0.08
TUR	CHE	1,837,686	0.55	0.21	-0.23	-0.85
TUR	IRN	1,783,694	2.79	0.80	0.00	2.83
ZAF	CHN	5,763,520	9.02	0.10	0.00	0.47
ZAF	DEU	5,145,031	4.10	-0.98	-0.73	-0.05
ZAF	USA	4,192,728	8.32	-0.09	0.00	0.87
ZAF	SAU	2,962,364	16.91	2.21	0.00	0.40
ZAF	IRN	2,592,846	8.26	-1.41	0.00	-1.04
ZAF	GBR	1,953,679	4.54	-0.90	-1.00	-0.40
ZAF	JPN	1,890,614	7.30	-0.09	0.00	0.10
ZAF	NGA	1,827,640	13.28	1.84	0.00	-1.69
ZAF	FRA	1,595,282	4.84	-0.95	-1.11	-0.41
ZAF	ITA	1,411,378	5.03	-0.91	-1.06	-0.68
ZAF	AGO	1,369,714	0.05	-0.05	1.82	2.51
ZAF	IND	1,033,003	10.02	0.26	0.00	0.81
ZAF	AUS	960,803	9.48	0.43	0.00	0.68
ZAF	THA	896,607	12.59	0.88	0.00	0.61
ZAF	SWE	806,043	4.07	-1.07	-0.94	-0.54

Notes:

1. Data from WITS/TRAINS. 6-digit HS level. All sectors.
2. Data for all countries pooled across 2006-2009, except:
   India: 2005, 2008, 2009; Mexico 2005-06, 2008, 2009; Turkey 2005-06, 2008, 2009.

Table 2: Unilateral Nontariff Measures
(since November 1, 2009)

NTB Measure	# "Red" Measure Implementations
Bail out / state aid measure	277
Competitive devaluation	5
Consumption subsidy	9
Export subsidy	151
Export taxes or restriction	82
Import ban	17
Import subsidy	1
Intellectual property protection	3
Investment measure	26
Local content requirement	22
Migration measure	34
Non tariff barrier (not otherwise specified)	46
Other service sector measure	11
Public procurement	33
Quota (including tariff rate quotas)	11
Sanitary and Phytosantiary Measure	15
State trading enterprise	8
State-controlled company	9
Sub-national government measure	1
Tariff measure	165
Technical Barrier to Trade	7
Trade defence measure (AD, CVD, safeguard)	441
Trade finance	11
Total	1385

Note:

1. Source: Global Trade Alert Database
2. Measures classified as "red" are implemented state measures that "almost certainly discriminate against foreign commercial interests".

Table 3: Descriptive Statistics

	ARG		BRA		CHN		IND		MEX		TUR		ZAF	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
t	10.185	7.253	12.734	7.471	8.786	6.069	11.889	12.085	7.114	9.721	2.660	11.266	12.605	12.639
t_{BND}	31.601	6.228	30.631	6.865	9.665	6.130	38.052	26.123	35.023	3.514	20.212	20.069	27.652	24.119
t_{BNDPRF}	26.990	12.324	27.706	10.831	8.964	6.136	36.594	26.312	16.475	17.002	8.372	18.610	21.887	24.342
IIT	0.075	0.196	0.104	0.223	0.197	0.276	0.181	0.274	0.079	0.198	0.132	0.243	0.085	0.206
IntermediateUse	0.774	0.263	0.638	0.268	0.771	0.278	0.604	0.282	0.777	0.294	0.757	0.317	0.684	0.311
VS	0.290	0.085	0.166	0.054	0.266	0.059	0.257	0.075	0.266	0.138	0.291	0.077	0.192	0.049
VS 1	0.206	0.090	0.210	0.097	0.226	0.097	0.236	0.082	0.125	0.076	0.220	0.068	0.206	0.111
z^{NET}/e	2.677	11.521	5.646	19.456	3.439	6.133	4.962	12.518	0.984	4.047	1.865	5.515	2.489	5.863
e	1.222	0.494	1.302	0.517	1.212	0.443	1.362	0.565	1.126	0.394	1.080	0.386	1.174	0.419
$1/e$	1.170	1.781	1.163	1.973	1.085	1.457	1.096	1.768	1.129	1.407	1.226	1.491	1.207	1.856

Note:

1. Sample organized bilaterally for each country. Only large partners included (Imports from partner > $ 750 Mn. in 2009).
2. Data for all countries pooled across 2006-2009, except: India: 2005, 2008, 2009; Mexico 2005-06, 2008, 2009; Turkey 2005-06, 2008, 2009.
   Sample size: ARG: 145642; BRA: 199533; CHN: 275344; IND: 75930; MEX: 232019; TUR: 91401; ZAF: 119400.

Variable	
t	Applied Tariff at HS-6 digits. Percentage points. Source: WITS database.
t_{BND}	Bound Tariff Rate, replaced by at HS-6 digits. Percentage points. Source: WITS database.
t_{BNDPRF}	Bound Tariff Rate replaced by Preferred Tariff Rate where prevalent (at HS-6 digits). Percentage points. Source: WITS.
IIT	Bilateral intra-industry trade: IIT=1 − |Imports-Exports|/(Imports + Exports). HS 6 digits. Source: WITS database.
IntermediateUse	Fraction of output used as intermediates inputs by all other sectors (see eq. (1)). Source: UNCTAD Input-output data (aggregated at 48 sectors).
VS	Vertical Specialization Measure 1: % of output used as intermediates by exporters in the same country (VS in Daudin et al. 2011) Constructed at GTAP aggregation of 55 input-output sectors, then mapped into HS 6 digits.
VS 1	Vertical Specialization Measure 2: % of output used as inermediates by exporters in all countries (VS1 in Daudin et al. 2011) Constructed at GTAP aggregation of 55 input-output sectors, then mapped into HS 6 digits.
e	Absolute import demand elasticity. Estimated at 6-digit HS level using panel data from 1988-2002. (Source: Kee et al. 2009). Adjusted for measurement error using Fuller (1986)
z	Output-to-imports ratio. Measured at 4-digit ISIC rev. 3 level.
z^{NET}	Net-output-to-imports ratio, where output is net of what is used as intermediates inputs by all other sectors (see eq. (1)). Uses IntermediatesUse to calulate net output.

Table 4: Baseline Models of Applied Bilateral Tariffs

	ARG	BRA	CHN	IND	MEX	TUR	ZAF
t_{BNDPRF} (+)	0.160***	0.269***	0.961***	0.218***	0.169***	0.402***	0.113***
	[0.002]	[0.002]	[0.0004]	[0.001]	[0.001]	[0.002]	[0.001]
IIT (−)	1.751***	1.215***	−0.0163*	−0.381***	−0.490***	−1.148***	0.688***
	[0.083]	[0.056]	[0.009]	[0.122]	[0.068]	[0.108]	[0.147]
IntermediateUse (−)	−0.581***	0.0751	−0.0472***	−4.827***	0.842***	1.765***	−11.56***
	[0.080]	[0.061]	[0.0105]	[0.160]	[0.061]	[0.122]	[0.107]
VS (−)	7.573***	26.29***	−0.494***	−26.62***	−10.60***	−8.967***	−3.442***
	[0.200]	[0.288]	[0.044]	[0.516]	[0.110]	[0.447]	[0.634]
VS1 (−)	−2.917***	−28.35***	−0.350***	−9.390***	−37.59***	−24.39***	−23.22***
	[0.234]	[0.194]	[0.0299]	[0.537]	[0.248]	[0.620]	[0.285]
z^{NET}/e (+)	0.046***	0.007***	0.009***	−0.013***	−0.011***	0.137***	−0.449***
	[0.002]	[0.0006]	[0.0004]	[0.003]	[0.003]	[0.005]	[0.005]
N	145642	199553	275344	75930	232019	91401	119400
Partner FE	184	242	223	132	243	304	227
Within R^2	0.06	0.26	0.95	0.39	0.17	0.53	0.25
Overall R^2	0.286	0.422	0.957	0.367	0.47	0.528	0.274
Frac. Var. FE	0.194	0.295	0.0695	0.153	0.412	0.165	0.202

Notes:

1. Standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1
2. Tariff data from WITS/TRAINS. 6-digit HS level. Agriculture, Mining and Manufacturing sectors.
3. Only large partners (total imports > $ 750 Mn. in 2009) included.
4. Data pooled across 2006-2009, except: India: 2005, 08, 09; Mexico 2005-06, 08, 09; Turkey 2005-06, 08, 09.
5. t_{BNDPRF} is the Bound rate augmented by the Preferential rate where applicable:
   $t_{BNDPRF} = t_{BND,}$ but replaced by t_{PRF} whenever t_{PRF} is applicable.

Table 5: Tariffs Before and After 2009 (Dep. Var.: Bilateral Applied Tariff Rate in percentage points)

	ARG	BRA	CHN	IND	MEX	TUR	ZAF
t_{BNDPRF}	0.159***	0.254***	0.969***	0.229***	0.180***	0.382***	0.0996***
	[0.003]	[0.002]	[0.0005]	[0.002]	[0.002]	[0.002]	[0.001]
$t_{BNDPRF} \times I_{2009}$	0.006	0.057***	−0.035***	−0.035***	−0.046***	0.058***	0.165***
	[0.006]	[0.005]	[0.001]	[0.003]	[0.003]	[0.003]	[0.005]
IIT	1.760***	1.270***	−0.0297***	−0.359**	−0.428***	−1.010***	0.718***
	[0.093]	[0.064]	[0.010]	[0.149]	[0.078]	[0.130]	[0.166]
IIT × I_{2009}	−0.013	−0.195	0.0549***	−0.0683	−0.278*	−0.395*	0.0124
	[0.204]	[0.129]	[0.0205]	[0.256]	[0.161]	[0.230]	[0.350]
IntermediateUse	−0.995***	0.385***	−0.0871***	−5.805***	1.194***	1.863***	−11.77***
	[0.089]	[0.070]	[0.012]	[0.189]	[0.068]	[0.146]	[0.120]
IntermediateUse × I_{2009}	2.399***	−1.237***	0.158***	3.377***	−1.704***	−0.309	2.089***
	[0.200]	[0.139]	[0.0240]	[0.350]	[0.149]	[0.264]	[0.260]
VS	8.225***	21.00***	−0.268***	−27.75***	−10.43***	−9.295***	−2.418***
	[0.222]	[0.331]	[0.0515]	[0.615]	[0.123]	[0.537]	[0.715]
VS × I_{2009}	−4.352***	21.04***	−0.902***	3.940***	−0.853***	1.305	−5.358***
	[0.514]	[0.661]	[0.102]	[1.125]	[0.270]	[0.967]	[1.517]
VS1	−3.536***	−25.74***	−0.339***	−4.428***	−38.65***	−23.48***	−23.61***
	[0.262]	[0.223]	[0.0347]	[0.645]	[0.277]	[0.743]	[0.319]
VS1 × I_{2009}	3.368***	−10.34***	−0.0997	−16.22***	5.457***	−2.941**	5.649***
	[0.583]	[0.445]	[0.0678]	[1.161]	[0.615]	[1.344]	[0.702]
z^{NET}/e	0.044***	0.006***	0.007***	−0.013***	−0.012***	0.152***	−0.472***
	[0.002]	[0.0007]	[0.0005]	[0.003]	[0.004]	[0.007]	[0.006]
$(z^{NET}/e) \times I_{2009}$	0.011***	0.003**	0.009***	0.004	0.005	−0.042***	0.120***
	[0.004]	[0.001]	[0.001]	[0.006]	[0.008]	[0.011]	[0.012]
N	145642	199553	275344	75930	232019	91401	119400
Partner FE	184	242	223	132	243	304	227
Within R^2	0.07	0.27	0.95	0.39	0.17	0.53	0.25
Overall R^2	0.26	0.419	0.957	0.387	0.478	0.529	0.255

1. See Notes to **Tables 3 and 4.**

2. I_{2009} = 1 if year=2009, and zero if year ≤ 2008.

Table 6: Conditional Logit Model: Incidence of Antidumping Investigations Before and After 2009
Dependent Variable: Bilateral Antidumping Investigations (Binary)

	ARG		BRA		CHN		IND		TUR	
t	0.112***	0.0372	0.0983***	0.103***	0.0246	−0.174***	−0.112***	−0.130***	0.0146	0.0144
	[0.0223]	[0.0246]	[0.0186]	[0.0192]	[0.0302]	[0.0615]	[0.0282]	[0.0298]	[0.0144]	[0.0240]
$t \times I_{2009}$		0.171***		0.0793		0.260***		0.116		0.0194
		[0.0420]		[0.126]		[0.0651]		[0.0717]		[0.0309]
IIT	0.307	0.289	0.6	0.485	−2.856***	−2.910**	−0.624	−0.707	0.998*	−1.399
	[0.560]	[0.654]	[0.589]	[0.650]	[0.949]	[1.153]	[0.473]	[0.539]	[0.545]	[1.348]
IIT × I_{2009}		0.202		1.002		0.311		0.32		3.568**
		[1.275]		[1.633]		[2.037]		[1.129]		[1.492]
IntermediateUse	1.470**	2.583***	1.523**	1.087	0.989	1.956	−1.511***	−1.813***	−2.211***	−0.878
	[0.639]	[0.736]	[0.686]	[0.715]	[0.988]	[1.279]	[0.445]	[0.495]	[0.733]	[0.887]
IntermediateUse × I_{2009}		−3.014**		6.367		−2.348		1.578		−6.114***
		[1.482]		[7.999]		[2.030]		[1.200]		[1.722]
VS	3.147**	5.518***	7.620**	7.963**	5.311	10.09**	−7.348***	−8.834***	−1.818	−2.345
	[1.555]	[1.927]	[3.429]	[3.533]	[3.769]	[4.525]	[1.579]	[1.769]	[1.761]	[2.088]
VS × I_{2009}		−6.436*		−28.17*		−7.671		8.042**		7.738*
		[3.337]		[16.86]		[7.273]		[4.067]		[4.010]
VS1	−4.896***	−7.571***	−0.505	−0.0656	1.651	1.11	10.68***	11.64***	13.33***	7.556**
	[1.665]	[2.005]	[2.377]	[2.463]	[2.012]	[2.705]	[1.521]	[1.698]	[2.805]	[3.624]
VS1 × I_{2009}		5.54		7.677		0.44		−4.886		18.97***
		[3.728]		[10.79]		[4.105]		[4.208]		[7.054]
z^{NET}/e	−0.0299	−0.0167	−0.000881	−0.000593	−0.293**	−0.353**	−0.0686**	−0.0818**	−0.064	−0.300***
	[0.0380]	[0.0455]	[0.00934]	[0.00908]	[0.123]	[0.142]	[0.0305]	[0.0352]	[0.0581]	[0.0748]
$(z^{NET}/e) \times I_{2009}$		−0.0722		−0.751		0.0981		0.0497		0.296***
		[0.0920]		[1.028]		[0.216]		[0.0677]		[0.0824]
predicted prob.	0.831	0.857	0.964	0.918	0.451	0.0003	0.129	0.192	0.643	0.555
N	32839		39462		61691		25418		20465	
Partner FE	21		22		26		18		18	
Pseudo R^2	0.04	0.06	0.05	0.07	0.08	0.13	0.07	0.08	0.05	0.12
LogLik	−547.7	−534.5	−398.5	−391.6	−271.2	−257.8	−580.3	−576.9	−364.3	−336.8
ModelChi2	46.07	72.5	43.19	57	49.83	76.64	92.69	99.6	34.36	89.31

Notes:

1. Standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1
2. AD data data from Bown's database at : http://econ.worldbank.org/ttbd.
3. Conditional logit drops partners with no within-variation. Partner FE indicates how many partners have within variation.
4. AD data too sparse for ZAF to get any results. Predicted prob for MEX=0 (i.e. marginals=0).

Table A1: Simple average, 6-digit HS bilateral tariffs

	ARG		BRA		CHN	
	2006-08	2009	2006-08	2009	2006-08	2009
Applied tariff (t)	10.33	9.71	12.51	13.31	8.94	8.15
Bound tariff (t_{BND})	31.75	31.51	30.70	30.72	9.59	9.71
MFN tariff (t_{MFN})	12.13	11.52	13.75	14.72	9.42	9.35

	IND		MEX		TUR		ZAF	
	pre-2009	2009	pre-2009	2009	pre-2009	2009	2006-08	2009
Applied tariff (t)	13.42	9.78	7.26	4.80	2.16	2.25	7.73	7.30
Bound tariff (t_{BND})	39.24	39.04	34.97	34.99	19.81	20.45	20.55	20.58
MFN tariff (t_{MFN})	13.67	10.01	14.11	11.18	5.04	5.27	9.56	9.63

Note:

1. Data from WITS
2. The three pre-2009 years for the following countries are:
   India: 2005, 2008; Mexico 2005-06, 2008; Turkey 2005-06, 2008;
3. The import-weighted applied rate average is significantly lower for countries in PTAs.